

I claim:

5           1. A tube segment for treating a disease process in  
the vicinity of a luminal structure, said tube segment  
including radioactive material for producing radiation for  
treating a disease process, said tube segment being adapted  
10 to be carried by a balloon catheter having a catheter shaft  
and balloon for insertion in the luminal structure, and  
being made of expandable and collapsible material, whereby  
its shape may be determined by the shape of the balloon.

15           2. The tube segment according to claim 1, wherein the  
radioactive material is in the form of a coating.

20           3. The tube segment according to claim 1, wherein the  
tube segment comprises a mixture of radioactive material  
and non-radioactive material.

25           4. The tube segment according to claim 1, wherein the  
tube segment comprises non-radioactive material into which  
is adsorbed radioactive material.

30           5. The tube segment according to claim 1, wherein the  
tube segment has adhesive material on its inner surface,  
for adhering the tube segment to the balloon or catheter  
shaft.

35           6. The tube segment according to claim 1, wherein the  
radioactive material is present in a predetermined dosage  
per surface area of the tube segment when the tube segment  
is in an unexpanded state, but wherein the dosage changes  
as the tube segment is inflated.

40           7. The tube segment according to claim 1, wherein the  
tube segment is expandable in a range of sizes.

          8. An apparatus for treating a disease process in the  
vicinity of a luminal structure, comprising:  
a balloon catheter having a shaft and an inflatable

balloon; and

a tube segment adapted to be carried by and cover said balloon, said tube segment including radioactive material, and being made of expandable and collapsible material, whereby its shape may be determined by the shape of the balloon.

9. The apparatus according to claim 8, wherein the tube segment comprises radioactive material in the form of a coating.

10. The apparatus according to claim 8, wherein the tube segment comprises a mixture of radioactive material and non-radioactive material.

11. The apparatus according to claim 8, wherein the tube segment comprises non-radioactive material into which is absorbed radioactive material.

12. The apparatus according to claim 8, wherein the tube segment is adhesively attached to the balloon or catheter shaft.

13. The apparatus according to claim 8, wherein the tube segment is attached to the balloon or catheter shaft by heat sealing.

14. An apparatus for treating a disease process in the vicinity of a luminal structure, comprising:

a balloon catheter having a shaft and an inflatable balloon; and

a tube segment mounted on the shaft inside of said balloon, said tube segment including radioactive material, and being made of expandable and collapsible material, whereby its shape may be determined by the shape of the balloon.

15. The apparatus according to claim 14, wherein the tube segment comprises radioactive material in the form of a coating.

16. The apparatus according to claim 14, wherein the tube segment comprises a mixture of radioactive material and non-radioactive material.

5           17. The apparatus according to claim 14, wherein the tube segment comprises non-radioactive material into which is absorbed radioactive material.

10           18. The apparatus of claim 14, wherein the tubular segment is sheathed in foil.

            19. The apparatus of claim 14, wherein the tubular segment comprises a coil.

15           20. The apparatus of claim 14, wherein the tubular segment is impregnated with a radioisotope.

            21. The apparatus of claim 14, wherein the tubular segment is coated with a radioisotope.

20           22. A method for treating a disease process in the vicinity of a luminal structure comprising:

            inserting a balloon catheter into a luminal structure, said balloon catheter having an inflatable balloon and a tube segment of expandable and collapsible material and which includes radioactive material;

            inflating the balloon with fluid to expand the tube segment and move the tube segment closer to the interior of the luminal structure;

30           deflating the balloon and collapsing the tube segment; and

            removing the balloon catheter including the tube segment after a desired radiation dose has been achieved.

35           23. The method, according to claim 22, wherein the step of inflating comprises inflating the balloon with gaseous media.

40           24. The method according to claim 23, wherein the gaseous media is selected from the group comprising  $\text{Co}_2$  and Argon.

25. A tube segment for treating a disease process in the vicinity of a luminal structure, said tube segment including radioactive material for producing radiation for treating a disease process, said tube segment producing a radiation dose which varies along at least one dimension of the tube.

26. The tube segment according to claim 25, wherein the dimension is axial.

27. The tube segment according to claim 25, wherein the dimension is longitudinal.

28. An apparatus for treating a disease process in the vicinity of a luminal structure, comprising:

a balloon catheter having a shaft and an inflatable balloon; and

a tube segment adapted to be carried by and cover said balloon, said tube segment including radioactive material for producing radiation for treating a disease process, said tube segment producing a radiation dose which varies along at least one dimension of the tube.

29. The tube segment according to claim 28, wherein the dimension is axial.

30. The tube segment according to claim 28, wherein the dimension is longitudinal.

31. An apparatus for treating a disease process in the vicinity of a luminal structure, comprising:

a balloon catheter having a shaft and an inflatable balloon, and including radioactive material; and

a tube segment at the distal end of a tube, said tube segment adapted to cover the balloon and to be moved longitudinally relative to the balloon to uncover the balloon to thereby respectively shield and unshield the radioactive material from the luminal structure when deployed.

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100
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